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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/747,725	12/29/2003	Patricia Chapman Irwin	134756-1	6638

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EXAMINER

JACKSON, MONIQUE R

ART UNIT	PAPER NUMBER
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1773

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/29/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/747,725

Applicant(s)

IRWIN ET AL.

Examiner

Monique R. Jackson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11, 13, 15, 16 and 21-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 13, 15, 16 and 21-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Upon reconsideration, prosecution is reopened in view of the following new grounds of rejection. Any inconvenience to the Applicant is regretted.
2. The after-final amendment filed 2/28/07 has been entered. Claims 1-11, 13, 15, 16 and 21-32 are pending in the application. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 3, 4, 9, 13, 15, 16, and 21-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Park et al (USPN 6,849,926.) Park et al teach a layer of an ultra low dielectric constant composite material or insulator containing nano magnetic particles and semiconductor devices using the low dielectric constant composite material layer wherein the material comprises an organic material such as polyimide (PI), epoxy, polymethylmethacrylate or methyl silsesquioxane, (reads upon “*thermosetting polymer*”) and spherical or non-spherical nanoparticles having a maximum dimension of 5.8nm and consisting of Fe₂O₃, chromium oxide, europium oxide, NiZn-ferrite, MnZn-ferrite, yttrium-iron garnet (Abstract; Col. 2, lines 22-54;

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Col. 3, lines 55-67; Claims 1-2, 6-9 and 11-12.) Park et al teach that the thickness of the insulating layer is preferably at least one thousand times the maximum dimension of the nanoparticles, or 1000 times 5.8nm or 5.8microns reading upon (Claims 7 and 12.) Park et al teach that the non-spherical shape may include ellipsoid, needle, plate or tetrahedral (Col. 3, lines 59-61.) Park et al also teach examples including 4.8wt% nanoparticles in PI cured by elevating the temperature stepwise from 150°C to 200°C to 300°C (*reads upon curing at a temperature of about 100°C to about 250°C*), and particular Ni-Zn ferrite nanoparticles suitable for the invention including $\text{Ni}_{0.5}\text{Zn}_{0.5}\text{Fe}_2\text{O}_4$ as instantly claimed (Col. 6; Table 2.) Park et al further teach that the composite material can be advantageously used as an insulator for a semiconductor device, for example, after interconnections are formed on a semiconductor substrate, the composite can be used to cover the interconnections (*reads upon "an electrically insulating layer disposed upon the electrical component"* as instantly claimed; Col. 9, lines 45-60.) With respect to Claims 21-23, the Examiner takes the position that the insulator taught by Park et al would inherently possess the same electrical properties as instantly claimed considering the insulator taught by Park et al comprises the same materials and content as the instantly claimed invention. With respect to Claim 29, the Examiner notes that the recited mica is not positively claimed as part of the invention considering mica is an alternative filler material in Claim 28.

5. Claims 28-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Laurent (USPN 4,390,596.) Laurent teaches encapsulating an electronic component in a molding mixture comprising (a) a thermosetting prepolymer as generally described at Col. 2, line 53-Col. 3, line 4; (b) a free-radical polymerization initiator; and (c) up to 80wt%, preferably 10-75wt%, of the weight of the molding mixture of mineral filler of fine particle size, such as mica, talc, calcium

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carbonate, alumina, or silica, having a particle size of between 0.1 and 200 microns wherein 0.1 micron or 100nm reads upon the claimed particle size range, "up to 80wt%" fully encompasses the claimed weight content, and 10wt% falls within the claimed weight content range of the nanosized filler (Abstract; Col. 2, line 53-Col. 3, line 6; Col. 8, line 59-Col. 9, lines 6.)

6. Claims 30-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Keane et al (USPN 4,493,873.) Keane et al teach a corona-resistant, insulating composition and electrical conductors insulated therewith, such as a copper wire, wherein the insulating composition comprises polyimide, polyamide, polyester, polyamideimide, polyesterimide, or polyetherimide (*reads upon "thermosetting polymer"*) and from about 1 to about 35% by weight of dispersed alumina particles of a finite size less than 0.1 micron (100nm), preferably 0.005 to 0.050 micron (*reads upon "nanosized filler"*) wherein a coated wire can be prepared by coating a dispersion of the alumina particles in the resin onto the wire and curing at a temperature between about 330°C to 370°C under conventional conditions (Abstract; Col. 3, lines 30-50, Col. 4, lines 13-41.)

7. Claims 28-31 are rejected under 35 U.S.C. 102(a) or (e) as being anticipated by Fujimaru et al (USPN 6,783,828.) Fujimaru et al teach a resin composition suitable for use as an adhesive for semiconductor devices wherein the resin composition comprises 5-50wt%, preferably 7-30wt%, of inorganic particles having a mean particle size of 0.1 micron or less (100nm or less), and may be spherical, elliptical, flake, rod-like or fibrous; and a phase separated resin with a thermosetting resin content of 0.1 to 80wt% (Abstract; Col. 2, lines 60-65; Col. 3, line 1-Col. 4, line 18; Col. 7, lines 1-30; Col. 8, lines 23-45.) Fujimaru et al teach that the inorganic particles may be glass, alumina, zirconia, magnesia, silica, anorthite (comprises calcium oxide), zinc oxide, mica, calcium carbonate, or other ceramic powders or glass as listed at Col. 3, lines 28-

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Col. 4, lines 7. Fujimaru et al also teach that adhesive composition applied to a conductive film (reads upon claimed “electrical component”) or may be formed into a sheet, laminated on one surface to a copper-laminated TAB tape with wiring, an integrated circuit is bonded on the other surface of the sheet, and is then cured at 120 to 180°C (Col. 8, lines 23-54.)

8. Claims 28-31 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 2002064276A (JP’276A.) JP’276A teaches a thermosetting resin composition useful for coating electronic parts or as the insulating layer in a printed wiring board, wherein the composition comprises a thermosetting or photosetting resin and 0.01 to 5 weight % of inorganic filler, such as silica, having an average particle diameter of 5nm to 0.5 microns to 100 weight % of the resin component (Abstract.) JP’276A teaches that the type or class of inorganic filler is not limited, though silica is desirable, and that when the composition is used as a resin insulation of a wiring substrate, the particle size is desirably 7nm-300nm, particularly 10-100nm (Paragraph 0025.) JP’276A teaches that the thermosetting resin is preferably a phenolic resin or epoxy-modified phenolic resin (Paragraphs 0009-0015.) JP’276A also teaches that the resin composition may be applied to a conductor by spin coating on a substrate, for example, after forming a circuit thereon, or a double-sided copper-clad substrate as in the examples, or may be used as an insulating layer for protection of a chip; and further teach inventive examples at 0.25, 0.5, and 0.75 wt parts, as well as comparative examples, at 10wt parts and 20wt parts, of 70nm silica to 98 wt parts resin, that read upon the claimed invention (Paragraphs 0032-0041; Examples.)

Claim Rejections - 35 USC § 102/103

9. Claims 1, 3-9, 13, 15, 24, and 27-31 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sakurai et al (USPN 6,869,683.)

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Sakurai et al teach an electromagnetic wave absorber for use in shielding electronic components from electromagnetic (EM) waves, wherein the EM absorber comprising an EM-absorbing layer having an EM-absorbing filler dispersed in a silicone resin on one or both surfaces of an EM-reflecting layer having an electrically conductive filler dispersed in a silicone resin wherein the EM-absorbing layer has a volume resistivity of at least $10 \times 10^2 \Omega\text{-m}$, particularly when in direct contact with an electronic component (*wherein the Examiner takes the position that the electronic component to be shielded or the EM-reflecting layer read upon "an electrical component" and the EM-absorbing layer reads upon "an electrically insulating layer disposed upon the electrical component"; Abstract; Col. 8, lines 38-45; Claim 1.*) Sakurai et al teach that the uncured silicone resin is preferably an organopolysiloxane having a degree of polymerization of 100 to 100,000, especially 100 to 2,000, and a structure as shown by formula (1) and described at Col. 4, lines 28-67, wherein the curing agent may be an addition reaction curing agent or a peroxide curing agent (*reads upon Claims 5-8; Col. 4, line 28-Col. 6, line 29.*) Sakurai et al teach that the EM-absorbing layer comprises 5 to 80% by volume of electromagnetic wave absorbing filler including ferrite particles such as MnFe_2O_4 , CoFe_2O_4 , NiFe_2O_4 , CuFe_2O_4 , ZnFe_2O_4 , Fe_3O_4 , Cu-Zn ferrite, Ni-Zn ferrite and Mn-Zn ferrite, having a mean particle size of about 0.1 microns (100nm) to 100 microns, in flat or granular shape (Col. 7, lines 1-44.) Hence similar to the calculation made by the Applicants in the last response, the Examiner takes the position that 5% by volume of the ferrite particles taught by Sakurai et al would fall within the instantly claimed weight percentage ranges or read upon the claim endpoint of "about 15wt%" given the density of the ferrite particles and silicone resin disclosed by Sakurai et al and hence one skilled in the art would clearly envisage the claimed invention.

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10. Alternatively, one skilled in the art at the time of the invention would have been motivated to utilize any of the EM wave absorbing filler materials taught by Sakurai et al at a particle size of 100nm and an amount as low as 5% by volume utilizing any commercially available ferrite material or silicone resin which would obviously result in a weight percent that would fall within the claimed range.

Claim Rejections - 35 USC § 103

11. Claims 10, 16, 25, 26 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al. The teachings of Sakurai et al are discussed above. To improve the wettability of the filler particles, Sakurai et al teach that a surface treating agent for the fillers may be added to the silicone resin wherein conventional surface treating agents may be used (Col. 6, lines 30-37) but do not specifically teach that the surface treating agent is a silane as instantly claimed. However silane coupling agents or silane surface treating agents such as the silanes listed in Claim 11 are known conventionally utilized surface treating agents in the art to improve dispersibility or wettability of inorganic oxide particles mixed into resins, particularly silicone resins, and hence would have been obvious to one having ordinary skill in the art at the time of the invention for use in the invention taught by Sakurai et al. With respect to Claims 16 and 32, though Sakurai et al teach that Ni-Zn ferrite particle may be utilized, Sakurai et al do not specifically teach $\text{Ni}_{0.5}\text{Zn}_{0.5}\text{Fe}_2\text{O}_4$. However one having ordinary skill in the art at the time of the invention would have been motivated to utilize any Ni-Zn ferrite wherein equal amounts of Ni and Zn would have been obvious to one having ordinary skill in the art at the time of the invention. With respect to Claim 25, Sakurai et al do not specifically teach the coating method for producing the EM-absorbing layer however one skilled in the art at the time of the invention

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would have been motivated to utilize any conventional coating method including those as instantly claimed. Lastly, with respect to Claim 26, though Sakurai et al teach that the two layers may be cured together or separately, Sakurai et al do not specifically teach the curing temperature. However, Sakurai et al teach an example utilizing a curing temperature of 120°C, and hence, one skilled in the art at the time of the invention would have been motivated to utilize a curing temperature as in the example or to utilize routine experimentation to determine the optimum curing temperature based on the silicone resin and curing agent utilized, with temperatures close to the disclosed temperature of 120°C being obvious.

12. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. The teachings of Park et al are discussed above. Though Park et al teach that the composite material can be advantageously used as an insulator for a semiconductor device, for example, to cover interconnections formed on a semiconductor substrate, Park et al do not specifically teach that the interconnections are copper. However, copper is an obvious species utilized in the art, and the most common, for forming interconnections in the semiconductor art and hence would have been obvious to one having ordinary skill in the art at the time of the invention.

Response to Arguments

13. Applicant's arguments, see pages 13-19, filed 2/28/07, with respect to the rejection(s) of claim(s) 1-5, 9-11, 13, 15, 16 and 21-32 under 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, new grounds of rejection are made in view of Park et al, Sakurai et al, Laurent, Keane et al, Fujimara et al and JP'276A.

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14. Applicant's amendment filed 9/14/06 necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monique R. Jackson whose telephone number is 571-272-1508. The examiner can normally be reached on Mondays-Thursdays, 8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on 571-272-1284. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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March 26, 2007